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Section II (Remarks)

A. Allowable Subject Matter

In the June 23, 2006 Office Action, the examiner withdrew the prior restriction of claims 26-38, and stated that claims 1-10 and 12-38 are allowable over the prior art of record. June 23, 2006 Office Action, pages 2 & 6.

B. Claim Rejection Under 35 U.S.C. 102(e)

In the June 23, 2006 Office Action, claim 11 was rejected under 35 U.S.C. 102(e) over U.S. Patent Application Publication No. 2005/0103097 to Faltum, et al. ("Faltum"). The anticipation rejection of claim 11 is traversed for the reasons detailed below.

1. Law Regarding Anticipation

In order for a §102 rejection of claims to be legally proper, the single cited reference must meet the criteria stated in MPEP §706.02, i.e., the cited reference:

> "**must teach every aspect of the claimed invention either explicitly or implicitly. Any feature not directly taught must be inherently present.**" (MPEP §706.02, Rejection on Prior Art [R-1]).

The governing law of CAFC decisions is consistent with such MPEP standard:

> "Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration." *W.L. Gore & Assocs. v. Garlock*, 721, F.2d 1540, 220 USPQ 303 at 313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). It is not enough that the prior art reference disclose all the claimed elements in isolation. Rather, "anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim." *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984) (emphasis added). Further, "[u]nder 35 U.S.C. § 102, anticipation requires that ... the prior art reference must be enabling, thus placing the allegedly disclosed

matter in the possession of the public." *Akzo, N.V. v. United States Int'l Trade Comm'n*, 808 F.2d 1471, 1 USPQ2d 1241, 1245 (Fed. Cir. 1986).

2. Disclosure of Faltum (U.S. Patent Application Publication 2005/0105097)

Faltum relates to a cantilever sensor having "detection means for detection of stress or mass generated on a surface area of [a] sensor unit or units, e.g. in the form of a surface stress sensing element or a mass sensing element." Faltum, ¶[0001]. The background section of Faltum indicates that it is known that micro cantilevers having immobilized capture molecules (i.e., specific binding molecules such as DNA oligoes, proteins, antigens, antibodies, ligands, etc.) can be used for detection of molecular interaction. Faltum, ¶[0003] "When the capture molecules bind to an analyte in the sample that is presented to the cantilever, this will induce a change in the surface stress of the cantilever, and consequently the cantilever will deflect or stretch." Id. The deflection of the cantilever can be detected either (1) by measuring the reflection angle of the laser beam directed to the cantilever, or (2) by using a piezoresistor integrated into the cantilever, wherein deflection is detected as a change in the electrical resistance of the piezoresistor. Faltum, ¶[0003]. A problem to be solved by Faltum is to reduce the space required by such cantilever sensors on a sensor chip, and thus enable higher density and/or two dimensional arrays of such sensors. Faltum, ¶[0008].

Faltum describes the formation of a "pillar shaped primary substrate," to which a cantilever sensor may be attached, from:

> "one or more materials selected from the group consisting of **silicon, silicon nitride, silicon oxide, metal, metal oxide, glass and polymer**, wherein the group of polymers preferably includes the proxy resin, polystyrene, polyethylene, polyvinylacetate, polyvinyl chloride, polyvinylpyrrolidone, polyacrylonitrile, polymethylmetacrylate, polytetrafluoroethylene, polycarbonate, poly-4-methylpentylene, polyester, polypropylene, cellulose, nitrocellulose, starch, polysaccharides, natural rubber, butyl rubber, styrene butadiene rubber and silicon rubber."

Faltum, ¶[0027] (Emphasis added.).

Faltum further describes the use of a piezoelectric element useable as a surface stress sensing element or a mass sensing element. Faltum, ¶[0021]. The piezoelectric element may be "of a material selected from the group consisting of quartz, PZT, PVCF, ZnO or solgel." Faltum,

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¶[0022]. Alternatively, the **piezoelectric element may be in the form of a ceramic film.** Id.

As noted in Faltum at ¶¶[0023-0024]:

> [0023] The ceramics used for the piezoelectric film may e.g. be **ceramics containing** lead zirconate, lead magnesium niobic acid, **lead nickel niobic acid,** lead zinc niobic acid, lead manganin niobic acid, lead antimonic stannic acid, lead titanium acid, lead manganic tungsten acid, lead cobalt niobic acid, barium titanate or the like, or containing the components of any combination of the above material.
> [0024] Also, the piezoelectric film may be of **the above ceramics to which oxide of** lanthanum, calcium, strontium, molybdenum, tungsten, barium, niobium, zinc, **nickel manganin or the like,** any combination of the above material, **or other compounds are appropriately added.** For example the film may be of ceramics which mainly contain components consisting of lead magnesium niobic acid, lead zirconate, lead titanium acid in addition to ceramics containing lanthanum or strontium.

(Emphasis added.)

In still another alternative in which the stress sensing element is a piezoresistor or a strain gauge, Faltum states that:

> ...the piezoresistor may comprise or preferably consist of a material selected from the group consisting of amorph silicon, polysilicon, single crystal silicon, metal or metal containing composition, e.g. gold, AlN, Ag, Cu, Pt and Al conducting polymers, such as doped octafunctional epoxidized novalac e.g. doped SU-8, and composite materials with an electrically non-conducting matrix and a conducting filler, wherein the filler preferably is selected from the group consisting of amorph silicon, polysilicon, single crystal silicon, metal or metal containing composition e.g. gold, AlN, Ag, Cu, Pt and Al, semi-conductors, carbon black, carbon fibres, particulate carbon, carbon nanowires, silicon nanowires.

Faltum, ¶[0025] (Emphasis added.).

3. Patentable Distinctions of Claim 11 Over Faltum

Claim 11 recites:

> **A gas sensor assembly comprising:**
> **a substrate; and**
> **a free-standing silicon carbide support structure comprising:**
> **at least one protruding support rising above the substrate and a lateral structure contacting the protruding support, wherein the lateral surface is coated with a layer of nickel or nickel alloy.**

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Nothing in Faltum discloses or suggests a silicon carbide support structure as required by claim 11. Faltum teaches a number of different materials, including specifically "*silicon, silicon nitride, silicon oxide*, metal, metal oxide, glass and polymer," but **Faltum fails to teach or even mention silicon carbide**. In contrast, such material is specifically recognized by Applicants in the present application to be particularly well-suited as a sensor for fluorine-containing compounds. As noted in paragraph [0019] of the instant application:

> "Such support structure may be fabricated by using silicon carbide, which demonstrates superior electronic, mechanical, and chemical properties, including but not limited to, high corrosion-resistance in harsh environments, and manufacturability in thin-film form suitable for forming microelectromechanical (MEMS) structures via microfabrication techniques."

Since Faltum fails to disclose any "silicon carbide support structure" as required by claim 11, such claim cannot be anticipated by Faltum.

Additionally, Faltum fails to disclose any "lateral surface [that] is coated with a layer of nickel or nickel alloy" as further required by claim 11. The examiner identifies paragraphs [0023] and [0024] of Faltum as disclosing the use of material, but such identification is mistaken in context. As noted previously herein, Faltum teaches that the piezoelectric film may be in the form of **CERAMICS** ***containing*** various materials such as "lead nickel niobic acid" or (oxides of) "nickel manganin," but **such disclosure is in no way equal to or suggestive of "a layer of nickel or nickel alloy" as recited in claim 11**. Metals and ceramics are readily recognized in the art of materials science as different classes of materials. Discussion of the meaning of the term "ceramic" at www.wikipedia.org includes the following statement:

> The American Society for Testing and Materials (ASTM) defines a **ceramic article** as "an **article having a glazed or unglazed body of crystalline or partly crystalline structure, or of glass**, which body is **produced from essentially inorganic, non-metallic substances** and either is formed from a molten mass which solidifies on cooling, or is formed and simultaneously or subsequently matured by the action of the heat."

Source: http://en.wikipedia.org/wiki/Ceramic (emphasis added).

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Given the well-recognized differences between ceramics and metals, one skilled in the art would not interpret the metal-containing ceramic piezoelectric film of Faltum as disclosing material "a layer of nickel or nickel alloy" as recited in claim 11. Therefore, since Faltum fails to disclose any "layer of nickel or nickel alloy" as required by claim 11, such claim cannot be anticipated by Faltum.

Finally, it is far from settled that Faltum discloses a "gas sensor assembly" as required by claim 11. Faltum states in various passages:

> The objective of the present invention is to provide a sensor suitable for use in the **detection of one or more *components in* a liquid** ... (Faltum, ¶[0009]); and
>
> The sensor according to the invention may preferably be used for **detection of *substances in* gasses or liquids**, preferably in liquids wherein the **substances include biomolecules such as RNA oligos, DNA oligos, PNA oligos, protein, peptides, hormones, blood components, antigen and antibodies.** (Faltum, ¶[0094])

Taken in context, Faltum would appear to be directed to sensing substances **IN** (i.e., entrained or carried in) gases or liquids (particularly biomolecular substance), NOT to sensing gases themselves as contemplated by claim 11. Since Faltum fails to disclose any "gas sensor assembly" as required by claim 11, such claim cannot be anticipated by Faltum.

Accordingly, withdrawal of the rejection of claim 11 under 35 U.S.C. 102(e) is respectfully requested.

C. Information Disclosure Statement

An Information Disclosure Statement is enclosed herewith for consideration by the examiner, with an accompanying Credit Card Payment form authorization payment of the $180.00 fee pursuant to 37 CFR 1.17(p).

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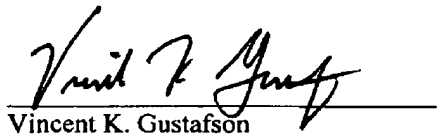
CONCLUSION

Claims 1-10 and 12-38 were previously indicated as allowable, and claim 11 has been fully patentably distinguished over the art on which the 102(e) rejection was based. A Notice of Allowance for claims 1-38 is respectfully requested. In the event that any issues should remain, Examiner Saint-Surin is requested to contact the undersigned attorney at (919) 419-9350 to resolve such issues without delay.

Respectfully submitted,



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Enclosures:

Supplemental Information Disclosure Statement [2 pgs.]
Completed Form PTO/SB/08a [2 pgs.]
Copies of two foreign patent references [6 pgs.]
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